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In Search of the Optimal Relationship:  
Air Interdiction to Ground Operations

by

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Fort Leavenworth, Kansas

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ground operations in Korea. It presents a theoretical construct for the nature of the optimal relationship, and observations for how to employ that relationship for maximum effect. The implications are based on current Army and Air Force doctrine, which recognizes the importance of air interdiction but does not clearly specify the need for the relationship to ground efforts.

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### Abstract

IN SEARCH OF THE OPTIMAL RELATIONSHIP: AIR INTERDICTION TO GROUND OPERATIONS, by Major Blaine W. Hyten, USAF, 46 pages.

Air interdiction is a critical component on the modern battlefield, and an essential element of operational fires to the operational commander. It must bear a relationship to ground operations to be truly effective, but that relationship has not been adequately clarified in the past or in current doctrine. Combat air interdiction operations since WWII have tended to become almost independent Air Force efforts without close integration with the ground effort. The result has been a lack of emphasis on this essential relationship in current doctrine and practice. This monograph is an effort to clarify that relationship.

This study examines interdiction theory from the perspective of classic pre-air era theorists, and then modern air era theorists. The historical example is based on air interdiction operations in the Korean War. That provides a framework of limited war, significantly varied ground operations, and air interdiction operations conducted by the new U.S. Air Force.

The monograph concludes by evaluating the relationship between air interdiction and ground operations in Korea. It presents a theoretical construct for the nature of the optimal relationship, and observations for how to employ that relationship for maximum effect. The implications are based on current Army and Air Force doctrine, which recognizes the importance of air interdiction but does not clearly specify the need for the relationship to ground efforts.

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## I. INTRODUCTION

The purpose of this monograph is to address the question: What is the optimal relationship between air interdiction operations against lines of operations and the ground campaign plan? The answer should provide insight into what is both an important element in modern warfare and a poorly understood area.

This monograph will address the question by examining applicable theory, a historical example, and the applicability of theoretical and historical insights to contemporary concerns. The theoretical study requires examining both classical and more current theorists to describe the basic concept of interdiction in both the pre-air and the air eras. This is important because the advent of airpower increased the effectiveness of interdiction. Besides expanding the possibilities, the relationship between air efforts and ground operations has become infinitely more important as airpower has evolved. The historical example will center on the air interdiction operations conducted during the Korean War, which was both our first "limited" war and our first war with a separate air force. While much of the attention to the air war centered on the first jet combat and "MiG Alley", the air interdiction operations played an important part in the conduct of the war. There were also important precedents set in both the relationship between the air and ground functions in warfare and the command and control aspects.

Finally, the study will draw conclusions based on the theoretical and actual application of the concept of air interdiction against lines of operations and the relationship to



the ground campaign. The theory provides the framework and history provides the actual application. Among the key areas of interest are whether the theory was correctly applied and whether it needed modification to fit modern limited war. Implications will be based on current Army and Air Force interdiction doctrine and an analysis of the extent to which current arrangements provide the optimal relationship between air and ground.

This subject is clearly important to today's concept of warfare. We are in an era where limited wars appear to be the norm. We are also in an era of increasing budgetary and political pressure to operate more effectively for less cost. The optimal relationship between air and ground efforts is therefore imperative. That relationship with respect to air interdiction is, and will be, an essential element in warfighting. This monograph is an attempt to understand and improve that critical relationship.

## II. THE THEORY OF INTERDICTION

A concise definition of interdiction is necessary to clarify the object of the theory and focus the historical example. FM 101-5-1, Operational Terms and Symbols, defines the verb to interdict as the ability to "1. isolate or seal off an area by any means; to deny use of a route or approach. 2. To prevent, hinder, or delay the use of an area or route by enemy forces."<sup>1</sup> Since the primary emphasis of this monograph is on air interdiction, it is worth noting that all the pertinent manuals use the same wording to define air interdiction. FM 101-5-1, FM 100-5, and AFM 1-1 all define it as "Air operations conducted to delay disrupt, divert,

or destroy an enemy's military potential before it can be brought to bear effectively against friendly forces." <sup>2</sup> Since these definitions are complementary, this study will use the first to address pre-air interdiction and the second to evaluate interdiction efforts conducted with airpower.

The Baron de Jomini formalized the concept of lines of operations in his book The Art of War. He explained that first there is a zone of operations which is composed of lines of operations. Jomini observed that, while there may only be a single line of operation in a given zone, "Generally...a zone presents several lines of operations." <sup>3</sup> To clarify that, he developed the concept of a principal line of operation, which he defined as follows:

"The principal line of operations is that followed by the bulk of the army, and upon which depots of provisions, munitions, and other supplies are echeloned and over which, if compelled, it would retreat." <sup>4</sup>

The concept of interdicting lines of operations predates the era of airpower. However, the interdiction had to be carried out by some element of the ground force. The relationship between the main and the interdicting force was much closer since it could easily be a senior-subordinate relationship. An example of that concept would be the way Nathanael Greene used his partisan forces, in effect, to interdict the British lines of operations as they moved into North Carolina during the American Revolutionary War. <sup>5</sup> The partisans were able to hinder and delay the British use of North Carolina and create a serious shortage of supplies which caused the British to withdraw. Another example in which

the interdicting force is the ground element is Napoleon's manoeuvre sur les derrieres, such as he employed at Ulm. That was clearly isolating or sealing off of an area, the opposing force's lines of operation, so they were forced to fight or surrender.<sup>4</sup> A look at the classic theorists of the pre-air era will show the theoretical base for the concept of interdiction.

Jomini considered the concept of what we now call interdiction as a form of strategic envelopment. He addressed it when he said:

"Finally, strategic operations to cut an enemy's lines of communications before giving battle, and attack him in rear, the assailing army preserving its own line of retreat, are much more likely to be successful and effectual, and, moreover, they require no disconnected maneuver during the battle."<sup>5</sup>

Clearly, it was not a consistently conducted operation since it might require either a small force out of supporting distance from its main army, or the entire army. However, Jomini definitely considered it worth discussing as a means of isolating and defeating an enemy.

He certainly acknowledged the possibility of an enemy force attempting to interdict friendly lines of operations. Jomini addressed a part of his work to "Protecting a Line of Operations by Temporary Bases or Strategic Reserves."<sup>6</sup> He was concerned with the need to establish defensive measures to protect lines of operations. That recognized the idea of an enemy wanting to interdict friendly forces. Jomini's concept of interdiction was clearly a form of maneuver to achieve a decisive defeat of an enemy force. It was a primary function for an army of that era,

not a supporting function as we think of it now.

Clausewitz also recognized the possibility of interdicting what he called lines of communication. In Book V, Chapter 16, he discussed the importance of roads as arteries from an army to its base as well as potential lines of retreat for that army. He did not call the operation "interdiction", but the effect he talked about falls into the area of isolating an area or hindering the use of a route by enemy forces. He said:

"Just as the roads are made to serve two purposes, the enveloping or turning movement may have two objectives. It may aim at disrupting, or cutting, communications, causing the army to wither and die, and thus be forced to retreat; or it may aim at cutting of the retreat itself." 9

Clearly, Clausewitz is also talking about a large force, if not the whole army, conducting these operations. Therefore, the relationship is implicit with the mission to destroy the enemy army, and is again part of the primary mission instead of a supporting function.

The Clausewitzian concept for an interdiction maneuver has implications for interdiction as it was seen then. He listed several considerations and goals as guidelines for the use of such a maneuver. They included:

--The enemy's food supplies, which one aims to cut off or reduce

--A threat to other communications with the interior of the country or with other armies or detachments

--A threat to the retreat 10

The first consideration is the only one which is possibly a subordinate function for something less than a major element of

the army. The primary nature of the general concept is still a direct action to defeat an enemy force. The advent of airpower brought about the potential to change the nature of that relationship.

Airpower, as it evolved, brought the ability to strike lines of operations in depth without committing major ground forces. The potential for the airplane to perform such missions was always present, but the idea for such employment had to await several events before it could come about. The airplane had to be mechanically capable of carrying the weapons to perform the mission and the idea of using it for such a purpose had to overcome the early conception that it could only perform auxiliary reconnaissance functions. The First World War witnessed those developments. After that war a number of military theorists recognized the potential of the airplane in a host of roles. Interdiction was one of those roles which could be carried out by the air component in coordination with the ground element. It was to be an adjunct to ground operations, complementary to instead of part of the ground force. Mitchell and Douhet were among the first to consider those types of missions for airpower.

Billy Mitchell addressed interdiction indirectly when he discussed targeting for his bombers. As the early premier advocate of the strategic bombing concept, he had developed his own concept of bombardment. Without calling it interdiction, Mitchell listed a number of target types which clearly fall into that category. In his own manual, which he had distributed to the Air Service in 1923, he listed the following targets for bombers:

"enemy aerodromes, concentration centers, training camps, personnel pools, transportation centers whether, rail, road, river or canal, ammunition and supply dumps, headquarters of staff commands, forts and heavily fortified positions, trains, convoys, columns of troops, bridges, dams, locks, power plants, tunnels, telephone and telegraph centers, manufacturing areas, water supplies and growing grain." <sup>11</sup> (emphasis added)

The AFM 1-1 definition says that "Air interdiction attacks are usually executed against enemy surface forces, movement networks (including lines of communication), command, control, and communication networks, and combat supplies." <sup>12</sup> The highlighted targets on Mitchell's list qualify as interdiction targets by the current definition. These targets demonstrated his concern for the effect the destruction of those targets had on the destruction of the enemy.

Mitchell's primary efforts were directed towards the establishment of an independent air force, so his emphasis on the relationship between air and ground efforts was minimal. In fact his ideas strongly emphasized the rationale for an independent air force. Mitchell's primary theoretical concern was strategic bombing, but his influence on current air operations in the early 1920s incorporated an interdiction function. His concern in the 1923 Air Service was the preservation of "tactical spirit", which he emphasized through exercises. Mitchell's exercise missions attacked targets simulating truck convoys and trains, a clear indication that he considered interdiction missions essential for his air force.<sup>13</sup>

Giulio Douhet, the Italian airpower advocate, integrated the concept of what we call interdiction into the operations of his

Independent Air Force. He was so convinced of the capability of airpower and the validity of his ideas that he put the ground element in the supporting role for the air element. His emphasis was to gain control of the air so the air force could go on to win the war. With control of the air an air force can:

"Attack freely and powerfully from the air all the enemy territory,...surface military forces, including the latter's bases and lines of communication;" <sup>14</sup>

In Douhet's concept, the ground action was subordinate to air action and the principal function of the ground forces was "to resist on the surface in order to mass our strength in the air."<sup>15</sup> Although inverted from the way we normally consider it today, the idea shows that he considered ground action worth coordinating with air action.

J.F.C. Fuller discusses interdiction in terms of a "shot to the stomach" in his concept for destroying an army. Although he is best known as one of the first proponents of the tank and armored warfare, he also recognized the utility of airpower. In his Plan 1919 Fuller envisioned tanks making the primary deep thrust at enemy headquarters and "Meanwhile every available bombing aeroplane should concentrate on the various supply and road centers."<sup>16</sup> While Fuller did not use the term "interdiction" in Foundations of the Science of War, he clearly used the concept by the definition used in this monograph. He stated that to defeat an army:

"The brains of an army are its staff - army, corps, and divisional headquarters; could we now remove these from an extensive sector of the enemy's front

the total collapse of the fighting personnel would be but a matter of hours, even if only slight pressure is exerted, against it. Suppose, now, that no pressure is exerted, but that, in addition to the shot through the brain, a second shot is fired through the enemy's stomach - that is, his supply system behind his protective front; then his men will either starve to death or disperse to live." <sup>17</sup>

The concept of interdiction as we understand it today is implicit in Plan 1919 and this description. Since Fuller was so intent on armored warfare, he did not stress airpower as the mode to carry out this interdiction, but he saw the usefulness of aircraft in aiding that mission. However, he published a paper in 1920 which he recognized the need for aircraft and tanks to work together. He said "Aeroplanes would co-operate with tanks..."<sup>18</sup> He was attempting to predict future types of operations. Combined with the concept of a shot to the brain and one to the stomach, Fuller realized the need for a complementary air and ground relationship to bring about the defeat of an enemy army.

Basil Liddell Hart made several observations about the effectiveness of air interdiction in his theoretical writings. He recognized the potential of airpower in relation to his "indirect" approach. He said "Airpower might attain a direct end by indirect means -- hopping over opposition instead of overthrowing it."<sup>19</sup> His concept of interdiction was based on the advent of air power and highly mechanized forces. Their value was in "...cutting their supply lines, dislocating their control-system, or producing paralysis by the sheer nerve-shock of deep penetration into their rear." <sup>20</sup>



Aircraft provided the more flexible mode for performing those missions and Liddell Hart saw the impact of airpower through his observations of events in World War II.

He observed the effectiveness of the German Blitzkrieg using air and armor together to defeat their enemies. He said further:

"Even greater was the contribution that the British and American air forces made... to the success of the Allied armies and navies.... By their action against military objectives--particularly communications--they had a decisively crippling effect on the ability of the German armies to counter the Allied moves." <sup>21</sup>

In linking air interdiction to his indirect approach concept, airpower was a primary weapon to carry it out. The relationship between air and ground was that airpower could provide a major direct impact on the ground battle by its ability to strike the enemy indirectly, thereby freeing ground forces from that mission. Since Liddell Hart was a proponent of his strategy rather than a particular weapon system, he would have opted for the best system at the time working in coordination with the other--a very modern and synergistic approach.

Mikhail Tukhachevsky discussed air interdiction in terms of its ability to disrupt the front line efforts and to contain enemy rear area units. Considering that he was writing in the Soviet Union in the early 1930's, he was unusually perceptive about the possibilities for airpower and about its conduct of interdiction in relation to the ground effort. Much of his discussion concerned the use of airborne assault troops to strike at interdiction targets, but he also discussed bombing efforts.

Tukhachevsky described those efforts in terms of fighting enemy war production, which fits targets which come under the AFM 1-1 definition of enemy military potential. He also addressed denying an enemy use of its telegraph system to disrupt its rail nets. He conceived that aircraft could perform that mission:

"Such missions of destruction could be assigned routinely to each reconnaissance plane; aircraft may be assigned to fly back and forth in a systematic manner." <sup>22</sup>

His overall concept was containment of enemy forces throughout the depth of the battlefield. Airpower was an integral element to accomplish this in support of the total effort.

Tukhachevsky's influence on the Soviet 1936 Field Service Regulations was evident in the chapter entitled "Attack", which clearly outlined his concepts for the employment of airpower:

"In joint operations by all branches and services, offensive operations must have the objective of simultaneously overwhelming the entire depth of the enemy defense. This can be accomplished as follows: by air attacks against the reserves and the rear areas of the enemy defenses." <sup>23</sup>

This passage clearly foreshadows air interdiction in the modern context, specifically referred to as joint operations. His discussion of air efforts directly linked to the support of major ground efforts represents an excellent relationship for which the U.S. military is still searching.

V. K. Triandafillov, another inter-war Soviet theorist, addressed air interdiction as one element of air operations, with

its mission shifting to delay or destroy reserve formations. He also specified a distinct linkage to the major ground effort. He mixed the concept of close air support with our definition of air interdiction, but the linkages of air to ground operations are very clear. He said:

"In the early days of an operation, bomber aviation directs its main efforts against forces detected directly on the front and their close-in logistics. The mission of combat aviation is to prepare for and assist the destruction of this first target of the actions of the friendly shock grouping. Therefore, enemy organic columns, especially artillery units, initially will serve as the targets of its attack, with reserves and organic logistics the targets on subsequent days. At the moment arrival of new troops (major strategic reserves in vehicles or via rail) in the area of the operation is detected, combat aviation will shift the center of its efforts against these forces: against enemy detraining stations, assembly areas, and columns moving both by rail and via dirt roads." 24

Triandafillov's writing in 1929 recognized the significance of airpower as a combat force. His description marked air operations for a close and direct link with ground operations. The Soviets appear to have appreciated and adopted that concept. Considering their current command structure for air-ground operations, they have indeed established an effective relationship.

Based on these theorists, there are clearly two concepts for interdicting ground lines of operations. One is to use ground forces to perform that mission, which we now call deep operations.

The other is to use airpower which is our current method. The optimal relationship between air interdiction and ground operations is still not clearly defined by the Western theorists. The classic theorists do not appear to have made a distinction between the interdicting force and the remainder of the army since these forces were all part of the same ground element. The function of interdiction was subordinate to, but not reliant on, the primary force. The air era theorists realized the contribution airpower made to interdiction, but the relationship to ground operations remained unspecified. The Soviet theorists came the closest to clarifying that relationship since they integrated air interdiction operations into the overall ground plan. However, even they did not specify the exact nature of that optimal relationship. Analyzing a historical example can provide a framework to help clarify the relationship.

This paper will look at two concepts of air interdiction to aid in constructing that framework. The concept of "tension interdiction" addresses cases in which when the enemy force is engaged with the friendly force and they are dependent on their logistics system. Air interdiction attacks those lines of operations, weakening and possibly breaking that taut rubber band, the connection between the base of operations and the force in combat. The concept of "isolation interdiction" occurs when the enemy logistics system is not being taxed, and there may not even be any combat in the area to be isolated. These interdiction efforts are directed at cutting off or severely restricting access to a given geographic area. With those concepts in mind, this

paper will now examine air interdiction efforts conducted by the U.S. Air Force in the Korean War.

### III. AIR INTERDICTION OPERATIONS IN KOREA

In June 1950 Korea was the divided country it is today, but it was outside what the U.S. considered its line of defense against communism in the Pacific. The Soviet Union strongly supported the North Korean government which it had established when the country was divided at the end of World War II. The U.S. had been less than enthusiastic about support for the South Koreans. All of our regular troops were withdrawn in 1949,<sup>23</sup> and the U.S. had only a minimal advisory group in country. South Korea was a struggling young country working to build itself into some sort of stability under its recently elected government. With the view of monolithic communism prevalent in the U.S. and our policy of containment along stated lines, Korea had been left out. In a speech given to the National Press Club on January 12, 1950, Secretary of State Dean Acheson spelled out the defensive perimeter when he said it "runs along the Aleutians to Japan and then goes to the Ryukyus...to the Philippine Islands." <sup>24</sup> We had given the Communist powers every reason to believe that an invasion of South Korea would not be seriously contested.

Communist forces in 1950 were more unified than now; and communism, flushed with victory, was an expanding force in Asia. Although we now know that the communists were not a monolithic block, the Soviets were very much in the forefront of the communist movement and they had established themselves as a valid world power with their resounding victory in World War II.

The Soviets had been expanding their bloc of occupied territories since 1945 and they continued that trend into 1950.<sup>27</sup> The People's Republic of China had been in existence for less than a year, and was dependent on the Soviet Union for all forms of guidance and military equipment. The North Koreans were virtually a Soviet satellite state, particularly from a military standpoint. Despite some underlying tensions between the communist movements in Asia, the Asian communists acknowledged the Soviet Union as their world leader and they generally cooperated among themselves.

The U.S. had only an advisory force, the Korean Military Advisory Group (KMAG), in South Korea to help the new South Korean army prepare itself to defend against the North Koreans. The rest of our ground forces were still very much in the post-war status with marginal strength levels. The nearest units were the four occupation divisions in Japan. The new U.S. Air Force, particularly the strategic bomber force, had received a significant share of the defense emphasis. Bombers were America's front line for atomic delivery and many Americans believed that airpower was sufficient to maintain deterrence and the U.S. world power status. In addition to the policy signals we had sent concerning Korea, our military posture gave every indication that we were unprepared to fight any type of small or limited war.

Since there was no significant U.S. presence in Korea, we had made no defensive campaign plan and there was little opportunity to develop one in the opening weeks of the war. The 25 June attack came as a virtual surprise, and we were not even initially sure that it was more than a large border incident. Once that

issue was clear, we only committed piecemeal elements as we could get them over to Korea from Japan in an effort to stem the ever growing North Korean tide. It was a dramatic example of crisis management. The first indication of what turned into a campaign plan was MacArthur's famous claim to have conceived the Inchon operation while watching the South Korean retreat out of Seoul and across the Han river on 29 June.<sup>28</sup> Despite that, it was going to take a while before U.S., and then U.N., forces were to be in any position to exercise initiative in Korea.

In June 1950 the U.S. command structure in the Pacific was still very much geared to occupation duties. The headquarters for General MacArthur, who was the Supreme Commander for Allied Powers, and Commander, Far East Command (F.E.C.), was in Tokyo where he had virtually recreated Japan as a nation after World War II. The occupation and reconstruction had been the focus of U.S. military activities.

The structure of F.E.C. was as MacArthur deemed it to best enhance his functions in his area of the world. MacArthur had surrounded himself with favored staff officers including Major General Edward M. Almond, his Chief of Staff, and Major General Charles Willoughby, his intelligence officer.<sup>29</sup> Although F.E.C. was supposed to be a joint command, MacArthur had made only token efforts to build a truly joint staff. MacArthur delayed three years before creating joint elements in his command in response to a 1946 JCS directive, but those elements hardly filled the requirement for joint functions.<sup>30</sup> In the larger structure, there were Navy and Air Force commands within F.E.C., but the Army

command, supposedly under F.E.C., was in fact "a shadow headquarters, in which CINCFE personally commanded and the GHQ Far East Command staff doubled in brass as the theater-level Army headquarters staff." <sup>31</sup> While that arrangement was not particularly taxed during occupation duty, it certainly held potential cooperation problems for any wartime functions in a theater so sea and air dependent as the Far East.

The new U.S. Air Force was represented in F.E.C. by Far East Air Forces (FEAF) under the command of Lt. Gen. George E. Stratemeyer. The primary numbered Air Force under FEAF was the Fifth Air Force, based in Japan and commanded by Major General Earle Partridge.<sup>32</sup> Other numbered Air Forces included the Twentieth in Okinawa, and the Thirteenth in the Philippines. FEAF was primarily a forward deployed combat organization consisting of reasonably current fighter, fighter-interceptor, photo, light bomber, troop carrier, and combat rescue aircraft.

FEAF had established a defensive role, as directed by MacArthur. In fact, that was its primary mission and FEAF's subordinate units had been deployed to reflect that mission.<sup>33</sup> The major concern in the Far East was not a small war as in Korea, but a major attack by the Soviet Union against U.S. forces to initiate World War III. The result was readiness, but in a defensive mind set instead of offensive. The primary combat fighters were tailored for interceptor missions as well. The one element of FEAF that could handle the changes about to occur were its aircrews. A large number were combat veterans from World War II, and they were anxious to prove the value of the new U.S.



Air Force. They were soon to get their chance.

At 0400, 25 June, 1950, massed North Korean forces led by armor crossed the 38th Parallel in a surprise attack against South Korea. The South Koreans were no match for the well-equipped communist forces, and rapidly disintegrated as a fighting force. As the South Koreans fell back, the U.S. made the decision to help and began committing troops to the fight. Through diplomatic efforts the friendly force became a United Nations force which finally halted the North Korean advance at the Pusan Perimeter. During the ensuing fighting, until the Inchon operation and the breakout from the Perimeter, the U.S.-dominated U.N. forces fought a determined defensive battle which severely attrited the North Korean Army. Simultaneous air operations were dominated by close air support missions. FEAF efforts to initiate an air interdiction program were suppressed by MacArthur until field reports began to show lucrative targets which he realized could be attacked by interdiction. With MacArthur's approval in late July, FEAF began planning an interdiction campaign to start as soon as possible while continuing close air support operations.

Interdiction Campaign Number 1 began in August 1950 to halt North Korean forces in their headlong rush to the south. In the little more than 30 days the war had been going, FEAF had acquired a Bomber Command to perform the "strategic" bombing missions. However, the lack of a significant number of strategic targets freed many Bomber Command aircraft, the B-29s, to perform interdiction missions. The first missions of this campaign were conducted by B-29s on August 2, 1950.<sup>34</sup> The campaign was

designed to be a comprehensive program with specific targeting to strike at vulnerable North Korean supply lines.

The North Korean lines of operations during their opening advance to the south involved railroads and roads. (see Annex A-1) They were leading much of their force with Soviet supplied tanks and staying primarily on the roads. Because of the Korean terrain, roads and railroads often followed the same paths. The North Koreans, according to reconnaissance reports, were not only making extensive use of their transportation networks to bring forward troops and supplies, but they were repairing South Korean facilities to carry on those efforts through Seoul.<sup>35</sup> They were advancing and supporting themselves along the roads and railroads -- which generally pointed towards Pusan.

The interdiction targets in this campaign were rail yards, bridges and roads. The North Koreans were heavily dependent on these lines and this was an effort to employ tension interdiction. The actual interdiction target list included 44 rail and highway bridges, all but 13 of which were above the 38th parallel.<sup>36</sup> Targets below the 38th parallel were considered to be tactical and were given to Fifth Air Force and the Navy's Seventh Fleet air elements in an attempt to integrate air operations. Two problems were immediately apparent. Many of the tactical targets FEAF provided to Fifth Air Force were invalid, since they had been quickly drawn up. Close air support to the Eighth Army received the highest priority during the retreat to the Pusan Perimeter. Since the priority went to that mission, the tactical part of the interdiction campaign received a relatively low priority.

The primary function of the ground campaign at this point was to preserve the force by withdrawing in good order. The build-up of forces, under U.N. command since 8 July,<sup>37</sup> was too slow to stop the North Koreans. They continued their advance in their clear effort to throw all U.N. forces out of Korea. U.S. forces were unable to establish a line until 27 July when MacArthur ordered the Eighth Army commander, Lieutenant General Walker, to hold his line along the Naktong River--later known as the Pusan Perimeter.<sup>38</sup> Even after establishing that perimeter, U.N. forces were involved in vicious fighting as their force levels continued to build. Heavy attacks by dwindling North Korean forces continued into early September, but the balance had shifted, and they had failed to prevent the U.N. build-up in Pusan.<sup>39</sup>

The ground - air interdiction relationship was close during this campaign since the ground forces were putting enough pressure on the North Koreans to make them stretch their lines of operations tight. That provided valid interdiction targets which influenced the North Korean conduct of operations. This was a good example of tension interdiction. Until the first interdiction campaign was initiated, "the ground officers who dominated General MacArthur's staff had been lukewarm toward air interdiction,..."<sup>40</sup> Finally, reports from Korea convinced MacArthur of the need to do something and he stated that he wanted "a line cut across Korea, north of Seoul, to stop all communications moving south."<sup>41</sup> With those instructions FEAF set out to destroy the North Korean transportation system and cut off supplies to enemy forces in the south. By 4 September when

Interdiction Campaign Number 1 ended, 37 of 44 bridges targeted had been destroyed and North Korean supplies and replacements had been reduced to a trickle.<sup>42</sup> Although the CINC had generally directed the effort, the interdiction targeting had been done by FEAF planners within Air Force circles. While effective as a joint effort to stop the North Korean onslaught, the air interdiction program could have been more effective if it had had more integrated planning.

Interdiction Campaign Number 2 was initiated to support the Inchon landing operation. It started on 9 September and ran through the rest of the month.<sup>43</sup> The interesting aspect of this campaign was that it was designed to isolate the Inchon area, but not so much from North Korean units as from possible Soviet or Chinese intervention. It was a clear case of planned isolation interdiction. The targeting concentrated on bridges and rail routes into the Seoul-Inchon area to enhance the isolation of that part of the theater. Much of the remaining air effort during this phase was directed to immediate support for both the Inchon landing and for the Eighth Army's breakout from the Pusan Perimeter. Because of the emphasis on immediate support and the low likelihood of Soviet or Chinese intervention, this was a relatively low key campaign conducted mainly by the B-29 forces.

The North Korean lines of operations appeared to have remained roads and railroads during this campaign. One of the key reasons for MacArthur's plan to land at Inchon was to interdict those lines through Seoul with ground forces. (see Annex A-1). By the middle of September the North Koreans were in serious trouble

since their invasion had ground to a halt, but they kept up the effort to resupply. They had shifted primarily to night operations due to air superiority established by FEAF during daylight, and their infantry forces had proven the ability to filter into an area by night if they desired. Since the North Koreans were not considered the significant threat, FEAF was not worried about North Korean lines of operations but rather the potential Soviet or Chinese lines if those forces intervened.

Air interdiction operations were geared towards preparing the objective area for the Inchon landings. Bomber Command got the primary interdiction missions during this phase. FEAF planners provided the bombers with a target list of 56 rail and road bridges, mainly north of Seoul. Planners estimated that these efforts might not have much effect on North Koreans, but that they could severely restrict Soviet or Chinese forces trying to move into the area rapidly.<sup>44</sup> F.E.C. planners also wanted to use the B-29 units in support of the Pusan breakout, so the interdiction efforts were not considered as critical as close support in this phase.

The primary ground efforts were the Inchon landings and the breakout from the Pusan Perimeter. They were both parts of a coordinated effort to wrest the initiative from the North Koreans and restore the 38th parallel and the South Korean government. They both succeeded beyond MacArthur's dreams when the North Korean Army virtually disintegrated and began a massive, usually disjointed, retreat that did not truly end until the Chinese intervention in November. Overall U.N. superiority was telling

during this phase of rapid reversal and ground operations were cloaked in success.

Most interdiction efforts were pre-emptive in nature since they were to hamper a Soviet or Chinese intervention. They had the additional benefit of continuing to cut supplies to the North Koreans around Pusan. The relationship to the ground efforts were not as clearly defined in this phase, and these operations were a mediocre example of isolation interdiction. As the primary air effort, the close support operations overshadowed the interdiction efforts. The tie to ground efforts would have only been significant if the possible intervention occurred. Then, it might have been decisive. In fact, Interdiction Campaign Number 2 was a secondary effort which did contribute to the overall success of the operation, but not as significantly as did close support.

Interdiction Campaign Number 3 was conducted during the U.N. forces' advance towards the Yalu. It was planned as a tension interdiction effort, but there was very little tension in the North Korean lines and effective targets were sparse. The concept was to cut off retreating North Korean forces, but U.N. forces were advancing so rapidly that the interdiction operations sometimes hampered U.N. advances. All operations were designed to pursue and defeat the fleeing North Koreans. NKA lines of retreat followed coastal road and rail routes when enough of the force existed to use them. Interdiction operations became more like close support as the enemy melted away and roads and bridges became U.N. lines of operations. As interdiction targets were removed from the list of useful targets, interdiction missions

were reduced to the point that some B-29 units were prepared to return to the States. A major concern for what interdiction efforts remained was that they not accidentally violate Chinese or Soviet airspace. The interdiction part of the war had been won and was over.

The ground effort was marked by a rapid northward advance of the U.N. forces. MacArthur split his forces and advanced them out of supporting distance from each other. This split, with Eighth Army moving up the west coast and X Corps on the east coast, posed possible problems for air support. However, until ROK units began contacting Chinese ground units, later in October, the ground advance into North Korea was extremely successful and the war appeared to be drawing to a close on the ground as well. Some elements in the U.N. command were concerned about a possible Chinese intervention, but MacArthur did not consider it seriously. Following the planned consolidation along the Yalu, "home by Christmas" was the watchword of the day.

The relationship between ground and air interdiction efforts was poor during this phase primarily due to the rapid ground advances achieved. This was supposed to be tension interdiction, but the ground force was unable to put any significant pressure on an army that had virtually disintegrated. Therefore, there were no interdictible lines of operations functioning, and interdiction operations were actually extraneous. With no coherent enemy force opposing the U.N. forces, there was little need to do anything more than keep air interdiction and ground forces sufficiently separated. The physical air-ground relationship centered on

command relationships for air support to the two advancing ground elements. With the war apparently coming to a close, those relationships were not, however, decisive.

Interdiction Campaign Number 4 was planned before, but executed after, the Chinese intervention. The original purpose was to aid the U.N. consolidation along the Yalu, but it had to adapt quickly to the Chinese intervention. Planned as an isolation effort, it became a tension interdiction program after the Chinese entry. It actually began on 15 December 1950.<sup>45</sup> It continued until the Chinese advance had been contained and the line had been reestablished along the 38th parallel. The campaign was rapidly modified because the Chinese entry came as such a surprise to the U.N. forces that they were reeling under the initial attacks. Airpower became the only effective force to challenge the overwhelming Chinese superiority until the ground forces could recover. December was a lean month for interdiction as close support efforts drew the majority of ground attack missions. The real interdiction effort began in January 1951. This campaign was credited by Air Force sources as being a major contributor to stopping the Chinese drive and bringing about the beginning of negotiations.

The North Korean, and then Chinese, lines of operations were initially almost completely in the restricted areas of Manchuria with a few extending into the small area of enemy-held North Korea. However, after the opening attacks the Chinese lengthened their lines of operations as they drove south. In this offensive the CCF demonstrated the ability to diversify their lines of



operations and to infiltrate large units. This was to cause problems for interdiction effectiveness later in the war, but their initial advance was more than Chinese forces were prepared for and they abandoned their conservative methods.

"Eager to score a victory which would end the Korean hostilities, the Chinese moved southward over main and secondary roads and very seldom used the mountain path and trails which they had frequented in October and November." 44

When that proved impractical, the Chinese began moving at night and altered their movement techniques to minimize their exposure to air attack. They were moderately effective in keeping their lines functioning with those efforts.

The air interdiction efforts in the fourth campaign were extensive and had to be adapted to the changes brought about by Chinese entry into the war. The targeting was geared to the transportation networks in North Korea where it remained for the duration of the war. The interdiction area was divided into 11 zones and subdivided into "45 railway bridges, 12 highway bridges, 13 tunnels, 39 marshalling yards, and 63 supply centers--and FEAF promised to designate additional targets in accordance with the tactical situation." 47 (see Annex A-2). The efforts were clearly designed to destroy the lines of operations of a conventional army. The only problem was that the Chinese proved to be a not totally conventional force.

Initially X Corps and Eighth Army designed ground operations to consolidate along the Yalu. However, the Chinese intervention

forced a retreat. This time, though, retreat was more orderly than in June 1950. Once U.N. forces recovered from the initial shock they were able to resist the Chinese. Still, the line did not stabilize again until the early summer of 1951. The Chinese proved to be a crafty, persistent, capable enemy. Seoul had changed hands twice more before the line generally along the 38th parallel was re-established. This phase of ground operations was characterized by intense action by both U.N. and Chinese forces during the retreat and early stabilization. Then the fighting died down to more sporadic operations. The Chinese initially taxed their logistics and lines of operations but they were able to stabilize that system once the front stalemated.

The clear relationship between ground and air interdiction was evident in the attempt to stem the tide of Chinese Communist forces. MacArthur actually felt that "the Chinese Communists possess the capability of forcing U.N. forces out of Korea if they choose to exercise it...." <sup>42</sup> The situation was critical, and airpower was the one weapon that could still be offensive while ground forces regrouped. Since the Chinese were exercising and extending their lines of operations, there were opportunities to apply tension interdiction. Overall, the ground operation to air interdiction relationship was close because the ground forces put sufficient pressure on the Chinese to make them present their lines of operations as an interdiction target.

After the first year of the war, all efforts settled into a quasi-stalemate, and FEAF began longer-term air interdiction operations. General Matthew Ridgway had replaced General

MacArthur as theater commander, and he played a direct role with FEAF regarding the direction of air operations. The Communist forces, by then back in control of North Korea permanently, were forced to restore and maintain the transportation network. They had been able to infiltrate huge forces into the area immediately adjacent to the Yalu, but fighting along the 38th parallel required greater use of full scale lines of operations. Those transportation networks became the obvious targets for interdiction in operations with names like "Strangle" and "Saturate." These operations were to test the degree of effectiveness of air interdiction against the Chinese and North Korean forces which had relatively unlimited human resources.

The Chinese and North Korean lines of operations became the roads and railroads through North Korea, but they did not depend solely on either or both. (see Annex A-2). FEAF targeting analysis indicated that there were seven main supply routes entering the combat area. <sup>49</sup> Terrain dictated the major rail/road routes, although there were some secondary routes and bypasses. The north was relatively secure from ground action during this phase of stalemate. That allowed the Communists, with their extensive manpower resources, to use innovative methods to keep those lines of operations open despite intense air pressure. Those methods were to prove to be a real detriment to the interdiction operations.

As the ground situation stabilized, air interdiction efforts turned to railroads and supply lines in attempts to cut off the buildup of supplies to forward Communist forces. Fifth Air Force

intelligence officers, working closely with Eighth Army analysts, carefully studied the communist options for bringing supplies to the forward forces, and decided railroads were the key targets.<sup>30</sup> The ground stalemate situation provided airpower with a chance to prove its worth as the only offensively capable element of the U.N. command. FEAF wanted to make sure these operations were successful and therefore targeted carefully. General Otto Weyland, the new FEAF commander, realized the importance of interdiction to achieving decisive effects.<sup>31</sup> The Communist rail systems were in for a beating.

The ground efforts during the remainder of the war primarily involved some limited attacks for favorable terrain and stabilization to wait for the armistice. In the summer of 1951, Eighth Army conducted several attacks to attain better positions. The remainder of the war was generally limited to local attacks and counterattacks. The war of movement in Korea had come to an end, and the war of negotiation had begun.

The interdiction efforts during this phase of the war were less directly tied to the ground effort, and were more of an attempt to probe the value and capabilities of airpower. This phase took on the characteristics of isolation interdiction. U.N. forces were not pressing the Communists, and they were not conducting major offensive operations. One major objective of the interdiction effort was to prevent the Communists from building up sufficient reserves of supplies and troops to initiate any sort of major offensive. It was also in this phase that airpower became the theater commander's vehicle to apply pressure on the

Communists. In that way it was more integrated into the overall plan as the primary offensive element.

The overall relationship between air interdiction operations and the conduct of the ground campaign varied significantly by phase in the conflict. The very beginning of the war saw a build-up of forces and a fighting retreat. Air interdiction was a low priority operation because of the more highly visible need for close air support. The air planners saw the need to institute an interdiction program despite the F.E.C.'s preoccupation with the short-term benefits of close support. When General MacArthur recognized the significance of an interdiction effort based on battlefield reports, he authorized appropriate actions. FEAF set into motion the air interdiction campaigns one through four, then subsequent operations after the ground battle stalemated.

The first interdiction campaign coincided with the initial retreat and Pusan Perimeter defense. Heavy ground fighting characterized this phase and North Korean lines of operations were taut. Tension interdiction was employed and was directly related to the ground effort because of the impact it had on disrupting the North Korean offensive. The second campaign was designed to isolate the Inchon area in support of the landings. It was classic isolation interdiction, but the relationship to the ground campaign was very limited because it was a pre-emptive action with low priority. It did not contribute directly to the success of the landings.

The third campaign was only marginally effective since it attacked the lines of operations of a disintegrating force. The

only pressure put on the retreating North Koreans was self-imposed and they were so disorganized as to be almost totally ineffective. The result would not have been significantly different if the third campaign had not been conducted so there was no serious relationship to the ground campaign. In this war of early rapid shifts, the fourth campaign rapidly became significant due to the Chinese entry. When interdiction resumed normal operations in January 1951, it was clearly employed as tension interdiction. The Chinese were stretching their lines of operations and the U.N. forces were resisting. The relationship was again closely aligned with the ground effort as the air interfered with the lines of operations while ground efforts forced the Chinese to use those lines.

Operations during the "stalemate" phase of the war were more a demonstration of the relative effectiveness of air interdiction as a separate weapon. The earliest efforts of Operation Strangle were closely coordinated with an Eighth Army limited offensive. The relationship and the results were initially excellent as tension interdiction inflicted hardships and shortages on Communist forces. After the pressure from Eighth Army died down, the interdiction lost effectiveness and targeting attention shifted to the rail networks. It was also conducted independently from the ground effort which had been reduced to limited local actions and, therefore, exerted very little pressure on Communist lines of operations. The last two years of air interdiction fell into the category of isolation interdiction attempting to cut off or delay logistics to forward deployed Communist units. However,

those operations were not successful in isolating the battlefield since there was no force to occupy, or take advantage of, the isolated area. The efforts were also ineffective as tension interdiction since the ground force was applying little pressure to the enemy to make them stretch their lines of operations. In fact, there was almost no relationship to the ground campaign. However, as the only offensive element of the theater campaign the interdiction effort played a major part in bringing about negotiations.

#### IV. CONCLUSIONS

Theory says that interdiction against lines of operations should not be carried out in isolation from the primary combat force. In other words, there should be a means-ends linkage. All of the theorists addressed interdiction as either a primary war winner conducted by major elements of the main force or as a supporting measure carried out to add to the primary effort. According to theory then, interdiction is always a means to achieve an end rather than an end in itself. Interdicting lines of operations must have the purpose of either denying those lines to an enemy who needs them or delaying operations along them so as to affect the enemy's ability to conduct combat operations. The end should be to contribute to the destruction of the enemy force. For tension interdiction to be effective, those lines must be actively used and they must be able to be affected by the interdiction. For isolation interdiction, the isolation must be taken advantage of during the relatively narrow window when those

access lines could have been used to interfere with the friendly force or reason for isolating that area.

The Korean War experience verified that interdiction alone could not bring about a mandated end state in a theater. During the numbered air interdiction campaigns the aim, which was not always successful, was for them to relate to the ground combat operations. The closest relationships existed during the first and fourth campaigns when intense ground operations were causing heavy use of lines of operations by the enemy. During the two year stalemated ground war, air interdiction operations were conducted as independent air efforts. The objective was to cut lines of operations to prevent to Communist forces from building their offensive potential at the front. That pressure was to help cause them to negotiate a settlement. That settlement was the end state specified by General Ridgway, the theater commander. However, the air interdiction operations were carried out without any serious pressure on the Communist lines of operations other than the interdiction itself.

The question naturally arises as to whether or not interdiction theory was applied to air interdiction operations in Korea. The numbered air interdiction campaigns had a theoretical base in their stated purpose. They were conducted with an attempted direct relation to the ground operations and the clear intent was to cut or disrupt active lines of operations. Although that did not work that well in the third campaign, it was not because it was unintended. However, the operations like "Strangle", conducted purely as air actions were on questionable



theoretical ground. Using air interdiction to achieve an end in the moral domain -- the settlement -- does not have a basis in theory. Those operations conducted without creating tension in those lines of operations violated the theoretical application of interdiction.

The theory of interdiction certainly appears to have applied to Korea since, although a limited conflict, it was a conventional war as both we and the theorists understand it. The Communist forces established and made extensive use of lines of operations. The fact that significant parts of those lines were untouchable because of limitations beyond military control did not detract from their existence as a theoretical target. Disrupting those lines had a definite impact on enemy forces when the lines were in heavy usage. During the ground stalemate those lines were not stretched tight and the interdiction against them was more of an attrition effort to wear down Communist resistance. While that ultimately contributed to the settlement, it was expensive in U.N. air assets. The Communists' innovative repair and recovery techniques insured that those lines were never truly closed. Had there been determined resistance by a competent enemy air force the cost could have easily been unaffordable. That entire series of operations, conducted without serious ground pressure, was not a proper application of theoretical interdiction.

Based on the interdiction operations conducted during the Korean War, both the positive and negative aspects, several observations are. These observations consider both theory and practice as seen in Korea.

1. Air interdiction operations should not be planned without regard for ground operations.
  - a. Interdiction against lines of operations may be conducted as tension interdiction with the ground force applying the pressure to keep the lines taut.
  - b. Isolation interdiction must be coordinated to take advantage of its time sensitivity. If the window the isolation creates is not exploited, the effort and resources will be wasted.
2. Limited war does not invalidate these concepts. The limitations must be compensated for.
  - a. If air is the only element that can attack and ground forces cannot apply pressure, then airpower must supply that pressure in coordinated air operations.
  - b. If certain targets are restricted or prohibited, other vulnerabilities must be found and attacked. Those may occur in the tactical or strategic air power realm so there must be a linkage if it is needed.
3. Air interdiction operations should not be conducted alone or in isolation from the aspect of pressure on the enemy. Alone, it becomes attrition by air which is not profitable.
4. Both ground and air commanders and planners need to understand and employ these relationships. In light of the complementary functions, this relationship is no longer optional.

The air interdiction operations were not conducted totally according to theory since theoretical concepts were developed to address a total war with sufficient resources. The theorists did not envision a situation where parts of the lines of operations and the base areas were protected from attack by political limitations rather than physical defenses. Air interdiction had to be conducted in light of those limitations and targeting had to be much more selective to have the desired effect. Limitations on effectiveness had to be accepted and

compensated for using other means. Compromises had to be made concerning that effectiveness and the use of certain weapons. Specifically, FEAF was unable to employ nuclear weapons which could have been massively destructive against the sometimes huge Communist manpower concentrations.<sup>52</sup> That is most likely a limitation we will always have to accept. Limited war is going to cause the need for compromises in air interdiction efforts with respect to weapons and targeting.

The essence of the optimal relationship between air interdiction and ground operations is simple. The ground force must apply some form of pressure on the enemy force to provide a valid objective for the interdicting forces to strike. That objective should be the enemy lines of operations and their associated functions. Alternatively, air interdiction operations may take place to isolate a portion of the theater of operations, whose effects will, in the future, be exploited by ground operations. The optimizing function is the CLOSE coordination essential to these relationships.

#### V. IMPLICATIONS

Air interdiction operations and the ground campaign must be closely and carefully linked for either to be truly effective in the modern battle environment. In the intensely lethal environment of battle neither element will be able to survive alone. Even in what we call low intensity conflict, the advent of relatively simple weapons with sophisticated capabilities pose serious threats to both air and ground elements. However, just

coordinating between air and ground will not insure maximum effectiveness of either system, or of both combined. Careful coordination and planning must be accomplished in light of theoretical concepts to insure valuable assets, time and personnel are not wasted.

Current Army and Air Force doctrine addresses air interdiction in terms of a joint effort that requires close coordination. That guidance appears inadequate to address the critical relationship between ground operations and air interdiction. The concept of creating tension in the lines of operations to be interdicted, or of isolating an area or force to be affected in the window of vulnerability must be addressed. Otherwise there is danger one element or the other will be misused or wasted. That is no longer a luxury we can afford.

The coordinating draft of FM 100-6, Large Unit Operations, only addresses interdiction in very broad terms. It refers to the concept of isolation by interdiction as a form of operational fire, and it discusses the army group commander's role in the development of the supporting air campaign plan. However, the discussion of campaign planning is the only place where air interdiction is referred to as requiring coordination at the operational level. Specifically the FM says:

"Campaign planning should strive for the most efficient use of resources to defeat the enemy, attacking throughout the theater with every means available. Deception, electronic warfare, psychological warfare, airborne and amphibious operations, conventional land operations, coordinated naval and air interdiction efforts, and

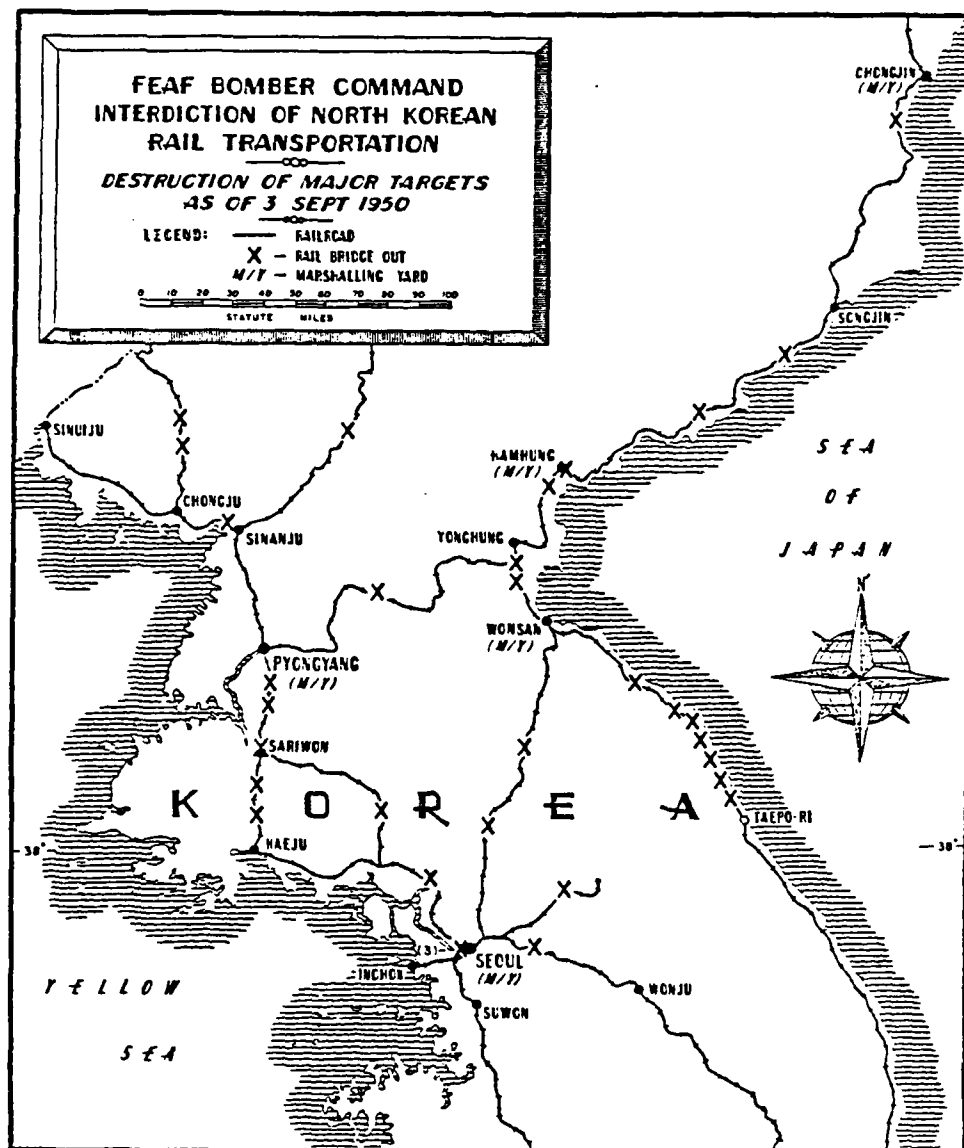
special operations should all be  
synchronized toward that aim." <sup>53</sup>

That is not descriptive of the relationship necessary to maximize air interdiction. The FM does refer to the Air Force doctrinal manual on tactical air operations, Tactical Air Command Manual 2-1.

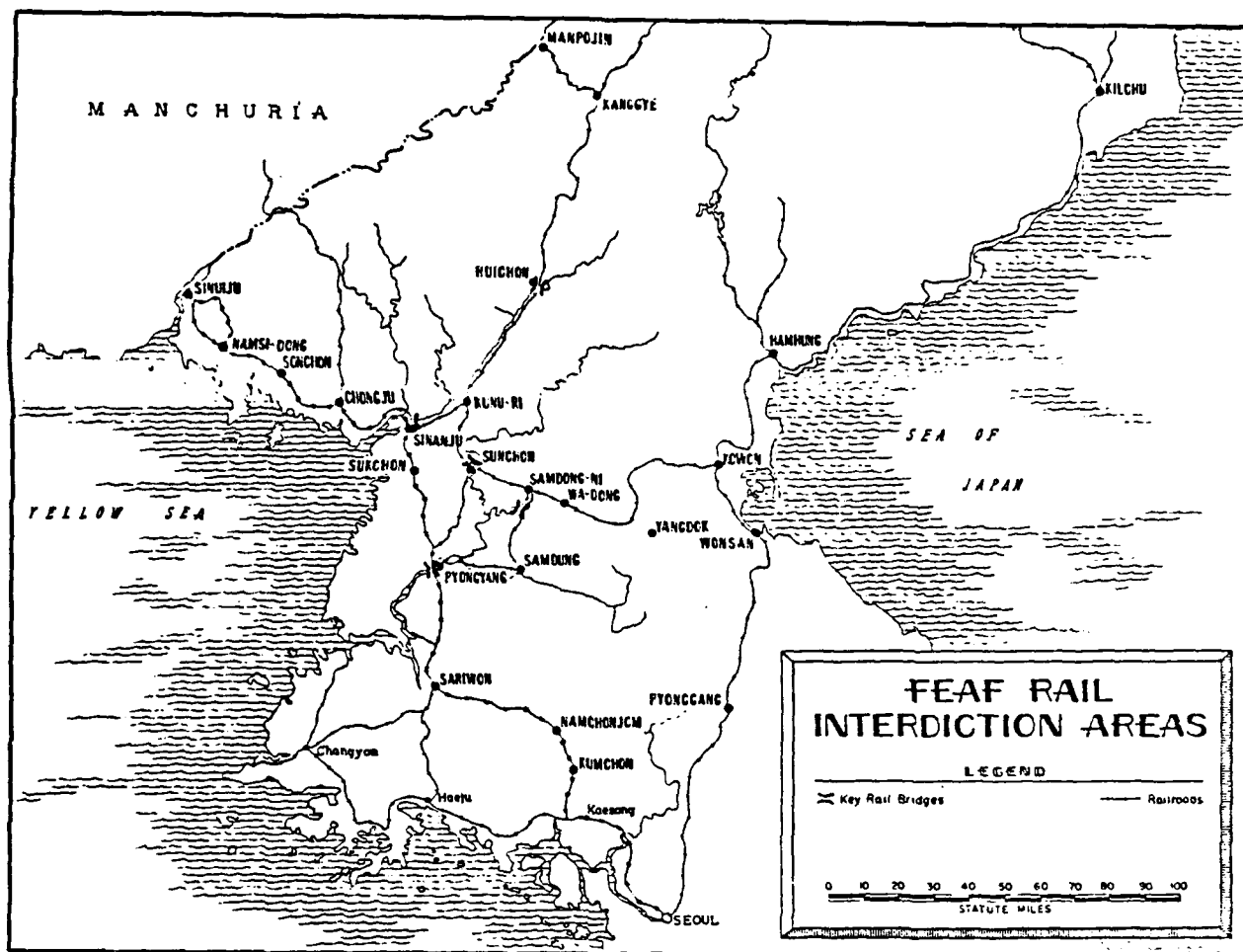
That manual, Tactical Air Operations, is more specific about air interdiction but is also broad on the aspect of coordination with the ground effort. It says that, "The Joint Force Commander initiates the interdiction program and outlines the broad plan of operations." <sup>54</sup> That implies a joint consideration of the overall program. The specific relationship is broadly and briefly mentioned at the of the chapter on air interdiction. It says, "...Continued pressure by friendly ground forces is required to cause the enemy to use up resources as they arrive in the battle area to preclude a build-up for a major offensive." <sup>55</sup> This gives a hint of the nature of the relationship, and it describes tension interdiction for a specific case. However, the exact nature of the relationship explained in this paper is lacking in the doctrinal manuals.

In light of the above, the current system is probably effective but not nearly as much as it must be in a future conflict. Specific suggestions to improve the current system can be adopted from the observations in the conclusion section. The real key to maximum effectiveness for air interdiction and ground operations is the critical relationship explained in this paper. That relationship is based on the theory developed in this paper and observations from the Korean War. The reader should consider that U.S. combat experience since WW II has been primarily with

light infantry wars, and that there are undoubtedly valuable dynamics between interdiction and ground operations in heavy mechanized warfare. Both the theory and the observations are valid and should be considered in order to revise current doctrine on air interdiction and ground operations in light of the optimal relationship between them.



Annex A-1



Annex A-2



## ENDNOTES

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